

JUL 20 1999

GARDEN LIBRARY

Some Commercial Uses of Pteridophytes in Central America

BARRY A. THOMAS

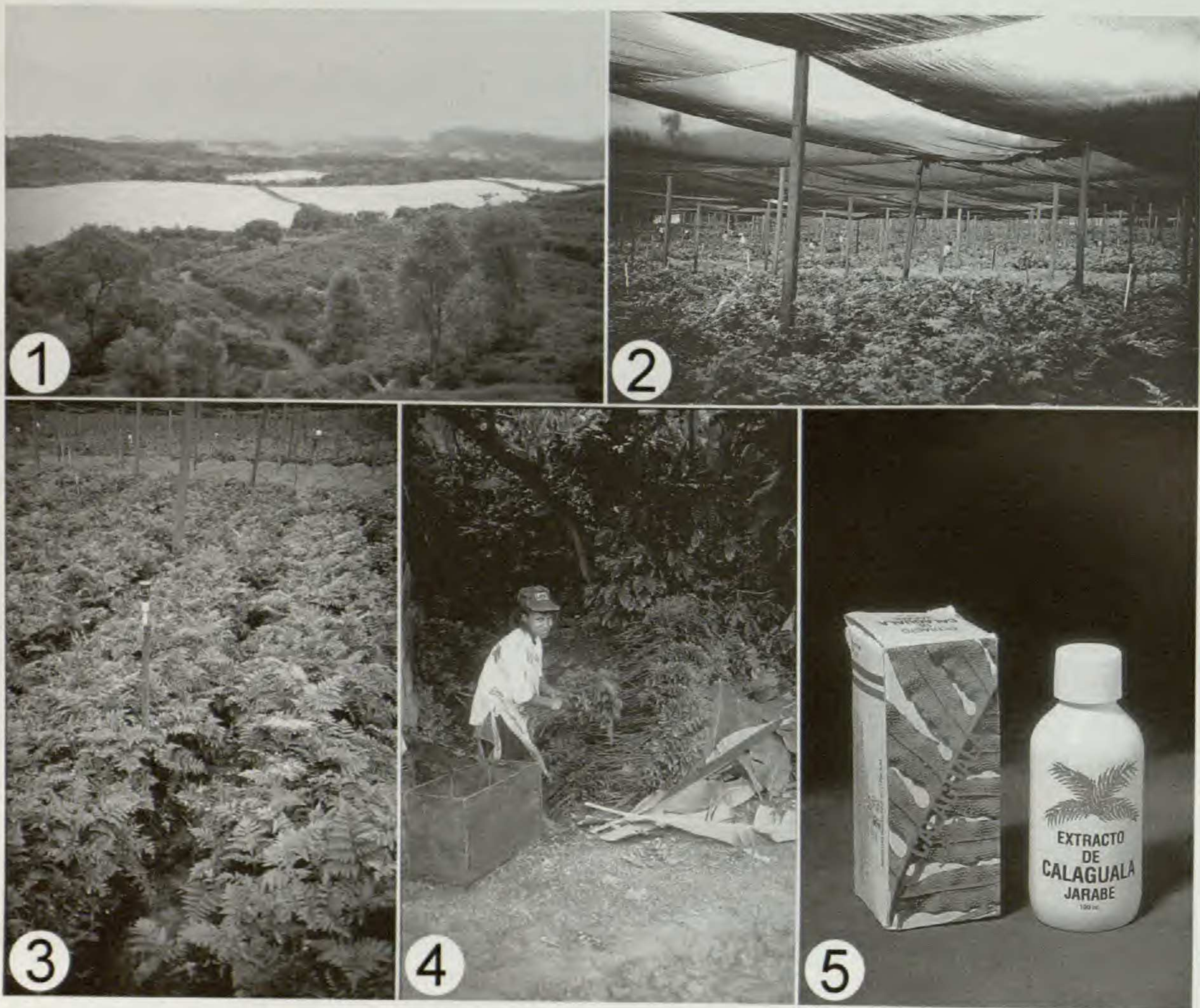
Geography Department, University of Wales Lampeter, Lampeter, Ceredigion SA48 7ED,
United Kingdom

ABSTRACT.—Leatherleaf fern is grown for the floral trade in at least three countries in Central America. *Polypodium leucotomos* is also cultivated in Honduras for production of DIFUR for the treatment of skin complaints such as psoriasis. Wild-collection of tree ferns for their fibre appears widespread and a limited number of other pteridophytes are wild-collected for medicinal use.

In late 1995, I was fortunate to be awarded a Winston Churchill Travelling Fellowship which enabled me to visit Central America to talk to many people about the relationship between plant conservation, agriculture, and horticulture in this botanically rich area. So, while travelling through the eight diverse countries, I was able to spend some studying the commercial production of two species of ferns and the sale and local use of wild-collected pteridophytes.

Although I anticipated seeing the leatherleaf fern, *Rumohra adiantiformis* (Forst.) Ching, I was surprised to see the extent to which it was cultivated in Costa Rica, Guatemala, and Honduras. In these three countries, this fern is locally cultivated over extensive areas, where whole hillsides can be covered with sheeting to shade vast numbers of plants (Figs. 1–3). The areas covered in this way were certainly very much larger than any I have seen in Florida. I saw no leatherleaf fern cultivation in Belize, El Salvador, Nicaragua, and Panama, and all enquiries gave negative replies. However, this cannot be taken to be definitive, because I was also led to believe by several Guatemalan agricultural botanists that no *Rumohra* was being grown in Guatemala. Even a professional guide that accompanied me had no idea what was being grown under the rather obvious and extensive shading.

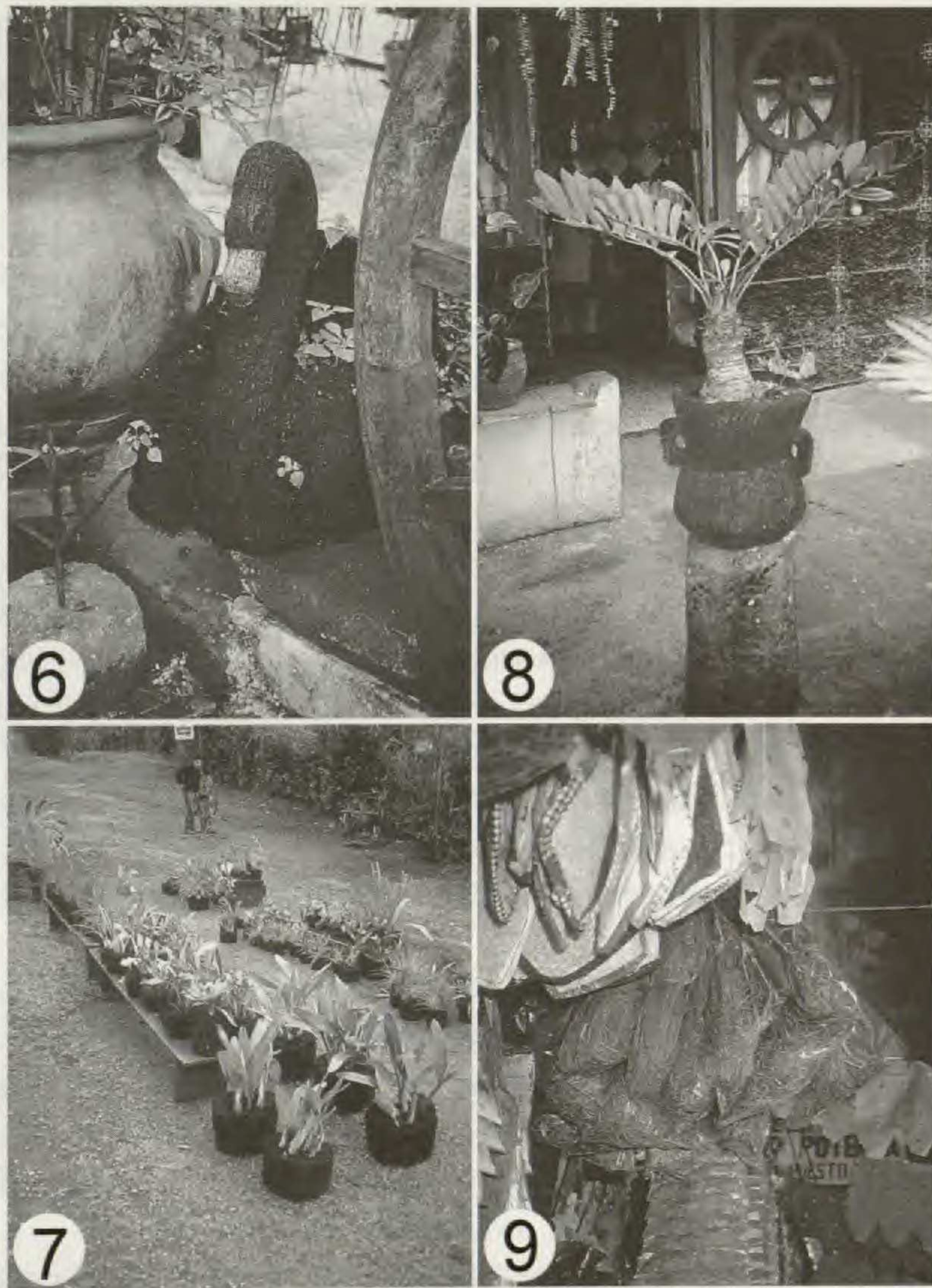
Stamp (1992) has outlined the propagation techniques of this species used in Florida, but conditions in Central America appear rather better. Land is not a problem and irrigation is only very infrequently necessary. Indeed, drainage seems to be more of a problem, because the rows of plants are separated by shallow ditches. Certainly, cold damage is not a potential problem, as it can be in Florida. Every site I visited had people working on the crop, either weeding, harvesting, sorting, or packing the fronds for transportation and ultimate export (Fig. 4). Although I have as yet no detailed export information on destinations or quantities, I did discuss them with some producers. I was led to believe that the annual crop was steadily increasing and that it was mainly bound for Europe or North America. In Guatemala City airport, I did watch boxes of fern fronds being loaded into KLM airliners, presumably bound for Amsterdam and then for sale on the international market. This is almost cer-



FIGS. 1–5. Cultivation and utilization of ferns in Honduras. 1) Extensive sheeting covering fern cultivation in Costa Rica. 2) Cultivation of *Ruhmora adiantiformis* under sheeting near Zamorana in Honduras. 3) Rows of *Ruhmora adiantiformis* in cultivation near Zamorana, Honduras. 4) Sorting and drying the fronds just outside the growing area. 5) Bottled and boxed calaguala from the factory at Tegucigalpa, Honduras.

tainly the reason that producers in Florida have experienced a decline in wholesale prices with production costs sometimes exceeding income (Smith et al., 1988).

Although it was fascinating to come around a corner or over a hill and see yet more extensive leatherleaf fern cultivation, it was even more exciting to encounter commercial production of a plant locally described as *Polypodium leucatomos* Poir. (the name is generally regarded as a synonym of *Phlebodium aureum* (L.) J. Sm., but the locally native species are *P. decumanum* (Willd.) J. Sm. and *P. pseud aureum* (Cav.) Lell.). Rhizomes of this fern are sold in markets, some pharmacies, and even on the pavements in Guatemala and Honduras as a cure for skin complaints, urinary and liver disorders, gastritis, rheumatism, and arthritis. But in Honduras, ten acres of this fern are commercially grown under sheeting about 200 km north of the capital city, Tegucigalpa. An estimated 2.5 million plants are grown on strips separated by ditches prepared for flooding when the plants are sprayed with water in the summer. Harvesting



FIGS. 6–9. Commercial utilization of pteridophytes in Mexico and Honduras. 6) A “swan” made from tree fern in a garden center in Xico, Veracruz, Mexico. 7) Wild-collected orchids in tree fern pots for sale at a roadside in Guatemala. 8) A wild-collected cycad in a tree fern urn in a garden center in Xico, Veracruz, Mexico. 9) Packaged *Equisetum bogotensis* hanging for sale in the central market at Tegucigalpa, Honduras.

is every three or four months, giving an estimated yield of between one and two million fronds. They are dried at about 50°C, ground up, and taken to the factory at Tegucigalpa for warm water extraction and cleaning with ion exchange charcoal. The final extract is concentrated at 40°C under vacuum. The concentrated liquid is marketed locally in Central America under the local name for the fern, “calaguala” (Fig. 5). However, it is also sold in capsule form as a prescribed drug in Spain, France, and the U.S.A., where it is marketed under the brand name DIFUR. This drug is claimed to have curative effects for skin complaints such as psoriasis (Azami, 1989; Gonzalez S. et al., 1994).

I was horrified to see the extent to which tree fern stems are being used as plant pots in several of the countries (Fig. 6). They were all clearly taken from wild-collected plants, for nowhere did I see any evidence of their commercial growth. The environmental effects of such indiscriminate collecting of tree

ferns is compounded by their use as containers for other wild-collected plants. In Guatemala, I saw the roadside sale of wild-collected orchids in tree fern pots (Fig. 7) and in the so-called nursery I was shown piles of tree fern stems ready for pot production. In a garden center in Veracruz, Mexico, I found more wild-collected orchids in tree fern pots, but even worse were the large, clearly wild-collected cycads in carved pots of much larger tree ferns (Fig. 8).

There is a noticeable difference between the countries in the extent to which plants and plant products are used medicinally. In Guatemala and Honduras, it was comparatively easy to find people selling plants and herbal medicines, but this no doubt reflects the much larger percentages of indigenous peoples still living in these countries. In Belize and Costa Rica, there seems to be a resurgence of interest, but this is often initiated by town dwellers or even foreign nationals living there. Nicaragua still has a largely and artificially urbanized population, because of the many years of civil war, and much of the economy of Panama is influenced or even controlled by the Panama Canal.

In both Guatemala and Honduras, I saw the horsetail, *Equisetum bogotense* Kunth (Fig. 9), the clubmoss, *Selaginella pallescens* (C. Presl) Spring, and the ferns, *Phlebodium* spp., on sale in markets and sometimes even spread out on pavements by roadside hawkers. The large horsetail, *Equisetum myriochaetum* Schltdl. & Cham., locally called "cola de caballo" or "barba de jolote," is reputedly good for kidney infections, colic, inflammations, and rheumatism, and as a vaginal wash. *Equisetum bogotense* is also said to be good for these disorders. *Selaginella* is reputedly good for kidneys, coughs, gripe, and intestinal discomfort. According to the literature, both the local *S. pallescens*, called locally "doradilla" or "rosa de Jerico," and *S. lepidophylla* (Hook. & Grev.) Spring, imported from Mexico, are available.

Local books on medicinal plants list a number of other pteridophytes (House et al., 1995; Chinchilla, 1995), although I saw none of these being sold in a recognizable form. They are: *Adiantum concinnum* Humb. & Bonpl. ex Willd. (culantrillo or pata de sante), *A. andicola* Liebm., *A. capillus-veneris* L., *A. tenerum* Sw., and *Asplenium scolopendrium* (hoja de ciervo or lagua de ciervo [this temperate species does not occur in Central America and the species used is possibly *A. serratum* L.]), for fever and bronchitis; *Elaphoglossum latifolium* (Sw.) J. Sm. (ciervo), for coughing, menstrual pains, and as a blood regulator; *Lygodium venustum* Sw. and *Pteridium aquilinum* (L.) Kuhn, for inflammation, muscular pains, and rheumatism. *Acrosticum aureum* L. rhizome is also said in Belize to be a cure for "madness."

ADDENDUM

I have no idea of the effects that last year's devastating floods have had on the cultivation of ferns in Honduras.

ACKNOWLEDGMENTS

I would like to thank Efrain Medina Campo (University of San Carlos, Guatemala City), Manfred Petres (Ministry of Natural Resources, San Jose, Costa Rica), Jorge Mendoza (Helechos Interna-

tional, El Picacha, Honduras), and Andrew Vovides (Instituto de Ecología, Xalapa, Veracruz, México) for their valuable help while I was in their respective countries. Finally I must acknowledge with grateful thanks the financial support from the Winston Churchill Memorial Trust, because without this my visit to Central America would have been impossible.

LITERATURE CITED

- AMAZI, M. 1989. Vitiligo repigmentation with anapsos *Polypodium leucatomos*. Int. J. Dermatol., 28:479.
- CHINCHILLA, S. V. 1995. *Plantas medicinales*, third edition. Grafa Print S.A., San Jose, Costa Rica.
- GONZALEZ, S., P. C. JOHSI, and M. A. PATHAK. 1994. *Polypodium leucotomos* extract as an antioxidant agent in the therapy of skin disorders. J. Invest. Dermatol., 102:651.
- HOUSE, P. R., C. TORRES, S. LAGOS-WITLE, T. MEJIA, L. OCHOA, and M. RIVAS. 1995. *Plantas medicinales communes de Honduras*. Lopez S. de R. L., Tegucigalpa, Honduras.
- SMITH, S. A., T. G. TAYLOR, and L. L. LOADHOLTZ. 1988. Cost of production for leatherleaf ferns in Florida. Staff Paper 342. University of Florida Institute of Food and Agricultural Sciences, Gainesville, FL.
- STAMPS, R. H. 1992. Commercial leatherleaf fern culture. Pp. 243–249 in J. M. Ide, A. C. Jermy, and A. M. Paul. *Fern horticulture: past present and future perspectives*. Intercept, Andover, Great Britain.